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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,267	11/26/2003	Geir Hovland	004501-749	6459

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EXAMINER
PATEL, SHAMBHAVI K

ART UNIT	PAPER NUMBER
2128	

DATE MAILED: 05/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/721,267	HOVLAND ET AL.
	Examiner	Art Unit	
	Shambhavi Patel	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>26 November 2003</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-10</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-10</u> is/are rejected.

7)☒ Claim(s) <u>3-10</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>26 November 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>11/26/03</u>.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claims 1-10 are pending.

Oath/Declaration

1.   The oath or declaration is defective. A new oath or declaration in compliance

with 37 CFR 1.67(a) identifying this application by application number and filing date is

required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because not all of the applicants have signed it.

Claim Objections

2.   **Claim 10** is objected to under 37 CFR 1.75(c), as being of improper dependent

form for failing to further limit the subject matter of a previous claim. Applicant is required to

cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or

rewrite the claim(s) in independent form. The claim is directed to storing the invention of claim 1

on a computer readable medium, and this is not further limiting the parent claim.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3.   **Claims 3 and 6** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per claim 3, the second limitation, if read independently, does not properly supplement the parent claim. The claims fails to tie the first limitation with the second limitation, and the Examiner suggests that the claim be rewritten to read:

> *The method as claimed in claim 1, wherein the stress exerted onto the component is computed from some or all of the process variables and is used as a driving force in modeling the growth of the at least one hypothetical crack.*

As per claim 6, the phrase "...at least one start-up or at least one shut-down of the power plant or" renders the claim indefinite because the Examiner cannot determine what the last 'or' is referring to.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4.   **Claims 1-4 and 6-10** are rejected under 35 U.S.C. 102(b) as being anticipated by *Isobe (US Patent No. 6,636,813).*

As per **claim 1**, Isobe is directed to a method for designing a component for an industrial plant, in particular a thick-walled component for a power plant, by means of an iteration comprising the steps of

   a. computing a plurality of process variables by means of a process simulator (column 5 lines 52-57; column 8 lines 10-13). Isobe discloses a client-server system configured as a life management system of the gas turbine for a gas turbine power-generating unit (column 5 lines 36-37). The client, a computer (column 7 lines 1-5) is used to collect data concerning operating states of the gas turbine. The server, a computer (column 7 lines 1-5) manages a program for performing the evaluation for the life of the turbine (column 3 lines 1-5).

   b. modeling growth of at least one hypothetical crack in the component, based on a structure of the component and the process variables (column 8 lines 19-20; equation 2). The growth of the crack is calculated by taking into account operating parameters such as gas temperature, warming temperature, and operating time for one start-up and shutdown (column 3 lines 21-27).

c. computing a life expectancy for the component by determining a time required for a dimension of the hypothetical crack to exceed a given critical limit (column 7 lines 64-67; column 8 lines 1, 30-33).

d. modifying the structure of the component (column 10 lines 6-21). After a method of repair is chosen, one of the candidate methods and the thermal barrier coating are applied.

e. repeating steps b) through d) until the time required for the crack dimension to exceed the given critical limit fulfils a pre-determined requirement (column 7 lines 64-67; column 8 line 1). An upper limit value for the life expectancy of the turbine is calculated based on the life of the specimen. The crack growth is then calculated and this calculation is repeated until the critical limit is reached (column 8 lines 23-32). In this way, the life expectancy can be determined. Damage analysis is then done for each parameter (column 9 lines 44-53) so that appropriate structural changes can be made.

f. characterized in that a time dependent load-profile and a dynamic process simulator capable of modeling transient process behavior is used to compute the process variables (column 3 lines 6-12; column 7 lines 42-49).

As per **claim 2**, Isobe is directed to the method as claimed in claim 1, characterized in that the process variables are re-computed by means of the process simulator each time the structure has been modified (column 10 lines 42-49).

As per **claim 3**, Isobe is directed to the method as claimed in claim 1, wherein in that stress exerted onto the component is computed from some or all of the process variables and is used as a driving force in modeling the growth of the at least one hypothetical crack (column 8 lines 10-13).

As per **claim 4**, Isobe is directed to the method as claimed in claim 1, wherein growth with time of a length a of the at least one hypothetical crack is modeled as creep crack growth according to $da/dt = (Ct)m$, where $C.sub.t$ a is crack tip parameter that depends on the component geometry and a stress exerted on the component, .gamma. a material creep constant, and m a component specific constant (column 8 equation 2). The equation disclosed by Isobe is used to calculate the crack growth for each on of start-up and shutdown. The variables in the equation are damage values or coefficients or indexes of a crack growth characteristic under the standard conditions and the remaining coefficients represent the effect of respective factors (figure 7; column 8 lines 49-54). They are time-dependent, and include creep, fatigue life, and crack growth characteristics.

As per **claim 6**, Isobe is directed to the method as claimed in claim 1, wherein the load profile contains at least one start-up or at least one shut-down of the power plant (column 8 lines 23-27).

As per **claim 7**, Isobe is directed to the method as claimed in claim 1, wherein the load profile contains a plurality of load changes (column 3 lines 6-12).

As per **claim 8**, Isobe is directed to the method as claimed claim 1, wherein the structure of the component is modified by modifying its material constitution or by modifying weld materials comprised by the structure (column 10 lines 14-21). The candidate repair method is carried out and the thermal barrier coating is applied to the turbine unit.

As per **claim 9**, Isobe is directed to the method as claimed in claim 1, wherein the computation of the plurality of transient process variables by means of the process simulator comprises a computation of tube temperatures and stress (column 3 lines 21-28).

As per **claim 10**, Isobe is directed to a computer program product comprising a computer readable medium, having thereon: computer program code means that, when loaded onto a computer, make said computer execute the method according to one of the claims 1 through 8 (column 2 lines 66-67; column 3 lines 1-7).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5.　　**Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over *Isobe* in

view of *Blandford ('Characterization of Fatige Crack Propogation')*.

Isobe discloses taking into account component specific variables when calculating the

growth of a crack. However, he does not take into account the critical values used in the claim.

Blandford teaches characterizing the propagation of a fatigue crack by using the

following equation:

$$\frac{da}{dN} = \frac{C\Delta K^{m}}{(1-R)K_{crit} - \Delta K}$$

Blandford defines delta K to be K(max) – K(min) (Blandford pages 1, 3).

At the time of the invention, it would have been obvious to one of ordinary skill in the art

to combine the teachings of Isobe and Blandford because this is the equation used by a variety of

researchers (Blandford page 3).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shambhavi Patel whose telephone number is 571 272 5877. The examiner can normally be reached on 7:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571)272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Shambhavi Patel
Examiner
Art Unit 2128

SP

KAMINI SHAH
SUPERVISORY PATENT EXAMINER